VuHeat
utility billing corp

User Manual for VHU Ultrasonic Heat Meter

VHU50/ VHU65/ VHU80/ VHU100

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1. General Description

This manual has been written to inform end users and installers of the properties, parameters, operation and installation of VuHeat ultrasonic heat meters (VHU50, VHU65, VHU80 and VHU100).

Heat meters are designed to meet the needs of measurement in heating, hot water and chilled water applications. (Hybrid / change-over versions available)

Complete heat meter is made up of:

- Ultrasonic flow meter
- A pair of PT1000 sensors
- Heat calculator unit (Integrator)

2. Energy Calculation

Q = mc Δt

Heat energy is calculated using the formula above.

Q = calculated energy

m = amount of water passing through the meter

Δt = Supply and return water temperature difference

C = fixed

3. Display

The Integrator unit features a liquid crystal display (LCD) with digits and special characters. There are three display menu's.

- Main
- Statistics
- Technical

All recorded data can be recalled via the button on the top of the device. A short press of this button recalls the data for the chosen menu display. In order to change the menu, keep the button pressed for more than 3 seconds. After 3 minutes the device automatically returns to the main cycle.

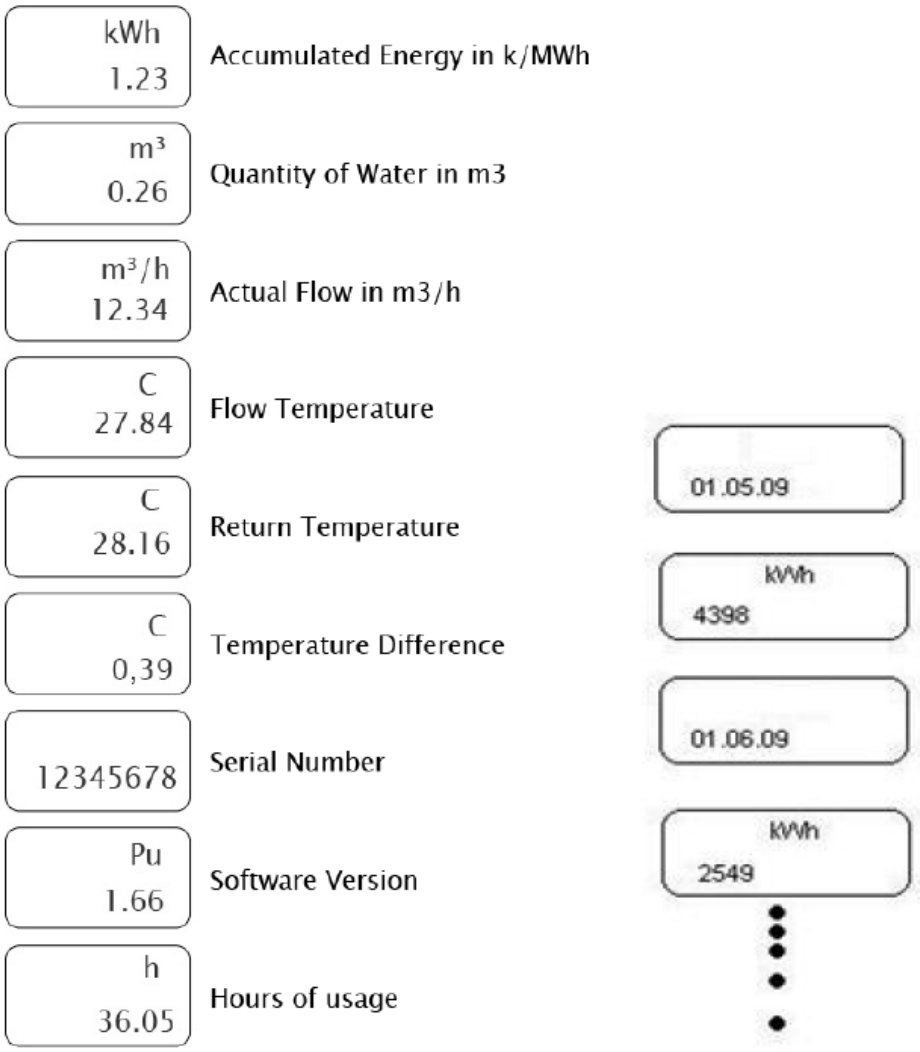
Main Menu

The main menu initially displays the values for the current date and by keeping the button pressed for 3 second the values for the last 12 months can be displayed one by one.

Display items:

1. Accumulated energy in k/MWh
2. Display segment test
3. Accumulated quantity of water in m^3
4. Actual flow rate in m^3/h
5. Return temperature
6. Supply temperature
7. Temperature difference
8. Serial Number
9. Software Version
10. Hours of operation

Change display item by depressing the button once.



4. Installation

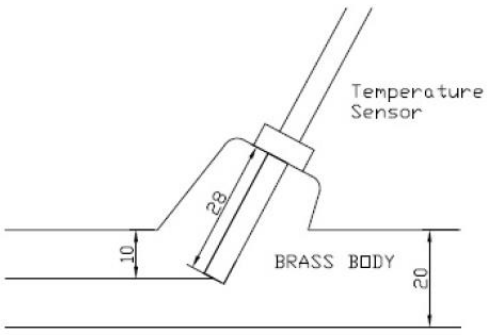
The flow direction is marked on the heat meter by an arrow. Both the heat meter and temperature sensors are to be installed in the same circuit of the heating plant, for correct operation.

VHU heat meters can be installed horizontally or vertically (inclined max. 90°). It is recommended that you install a dirt filter before the heat meter and a stop cock before and after the meter so that it can be removed if required without the need to drain down the system.

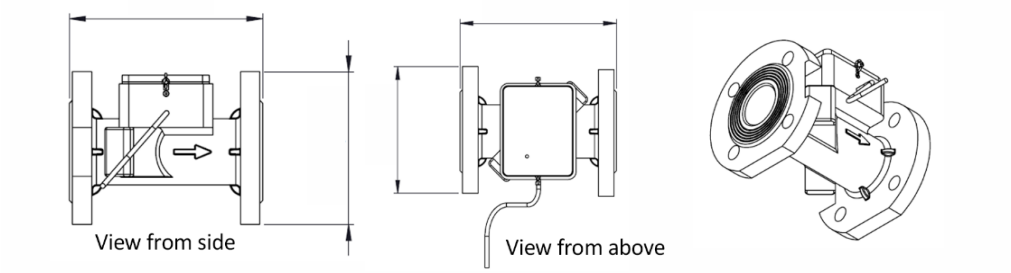
If installed vertically, the heat meter can be rotated around the vertical axis. The Integrator can be rotated in steps up to 270° for easier viewing. In general, proper operation requires the meter to be full of water with a stable flow. Carefully consider the installation location and other requirements before installing such as; system design, future installations, usage and maintenance. The installation location must avoid direct exposure to sunlight, flooding, freezing temperatures and contamination.

Before installing the heat meter make sure that all welding debris, metal burrs and sealing material have been cleaned out of the pipe. Ensure that the arrow direction on the meter is in accordance with the water flow direction. The heat meter must be installed as far away as possible from flow disturbances such as valves, three-way tubes, elbows, water pumps and filters. The heat meter cannot be installed at the suction side of the pump. Install the temperature sensors as per the stickers. Don't split or mix the paired temperatures sensors nor shorten or lengthen cables.

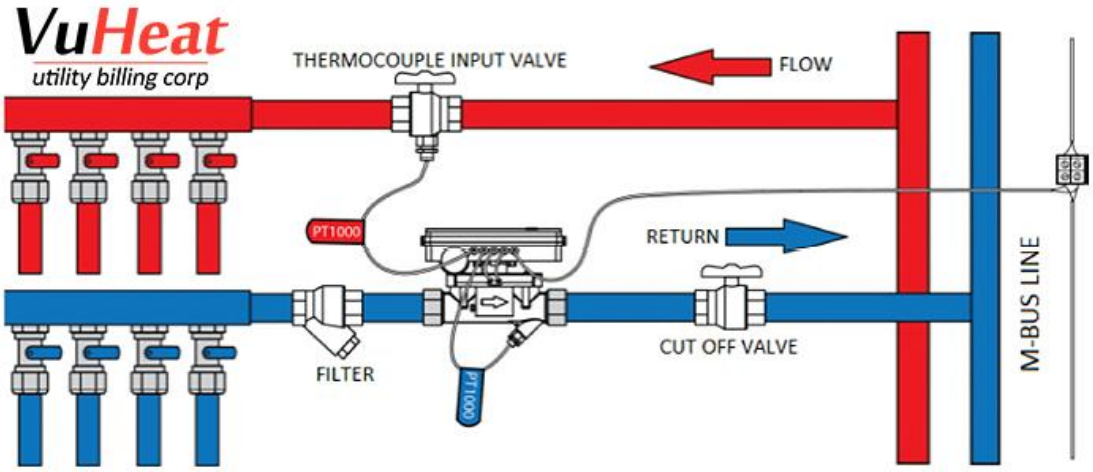
Avoid installing the heat meter on horizontal pipes with downward water flow and do not install at the free outlet of vertical pipes. Heat meters must not be installed at the top of the system where air bubbles can collect.



TEMPERATURE SENSOR IMMERSION DEPTH



DN	50	65	80	100
Normal flow (qp) m^3/h	15	25	40	60
Flange Diameter (mm)	165	185	200	220
Length (mm)	200	200	225	250
Net Weight (kg)	8.9	10.9	13.8	16.1



5. Battery

VHU heat meters are equipped with a lithium battery. This battery must not be opened by force, be short-circuited or exposed to water or temperatures exceeding 80°C. Empty batteries, electronic instruments or components should be disposed of properly at suitable collection centres or returned to us under our obligations to the WEEE Directive 2002/96/EC.

6. Interfaces

VHU heat meters have M-Bus, optional wM-Bus (RF 868) and Pulse Output interfaces.

7. M-BUS Interface

M-bus is an inexpensive and widespread network communication protocol for remote meter reading and data capture. It is suitable for small or large numbers of heat meters and is a serial digital communication interface that allows for very long transmission distances using industry standard cables. VHU heat meters are equipped with M-bus by default, which is delivered via two-wire cable, which can be lengthened with suitable cable (2 x 0.75 mm and screened). M-Bus voltage is 12-24 V DC or 24-36 V DC. M-Bus communication baud rate is 2400 for VHU heat meters. Our heat meters are tested to 0.001 m3 and 0.001 kWh resolution.

Parameter	Symbol	Unit	Model	Model	Model	Model
Type	-	-	VHU50	VHU65	VHU80	VHU100
Accuracy class (MID)	-	-	Class 2			
Limits of Temperature	ΘQmin	°C	5			
	ΘQmax	°C	90			
Limits of Temperature Difference	ΔΘQmin	K	3			
	ΔΘQmax	K	85			
Nominal Diameter	DN	mm	50	65	80	100
Length	L	mm	200	200	225	250
Height	H	mm	157.208	178.123	193.675	218.417
Permanent Flow Rate	q_p	m^3/h	15	25	40	60
Maximum Flow Rate	q_s	m^3/h	30	50	80	120
Minimum Flow Rate	q_i	m^3/h	0.15	0.25	0.40	0.60
Low Flow Threshold Value	-	m^3/h	0.1	0.2	0.3	0.5
Upper Limit of Thermal	Ps	kW	3000	5000	8000	12000

Maximum admissible working pressure	PS	Bar	16
Nominal Pressure	PN	Bar	16
Maximum Pressure Loss	P_l	Bar	0.25
Nominal meter factor	k	l/pulse	1000
Installation Position	-	-	Horizontal / Vertical
Installation Place	-	-	Flow or Return(default)
Protection Degree	-	-	IP54
Climatic Class	-	°C	+5 to +55
Environmental Class	-	-	A
Mechanical Class	-	-	M1
Electromagnetic Class	-	-	El
Indicating device	-	-	LCD 8 digits
Units Displayed	-	-	kWh, MWh, °C, m^3/h, m^3
Interfaces	-	-	M-BUS, wM-BUS, PULSE
Software Version / Check Sum	-	-	V 1.66 / CRCI6, OXFF
Heat medium / Carrier	-	-	Water
Resolution of LCD	-	m3	999999.99
	-	kWh	999999.99
Battery	-	V	3.6
Battery Life	-	Years	>5
Output Signal (Pulse) for Rate	-	-	1 kWh/Pulse
Output Signal (Pulse) for Testing	-	-	0.05 kWh/Pulse
Temperature Sensors as (EN60751)	-	-	PT1000
Temperature Probe Type	-	-	Short (DS)
Diameter of protective sheath	-	mm	5 or 5.2
Response Time	$\tau_{0,5}$	s	2
Cable Length - Sensor	-	m	1.5

8. Pulse Output Device

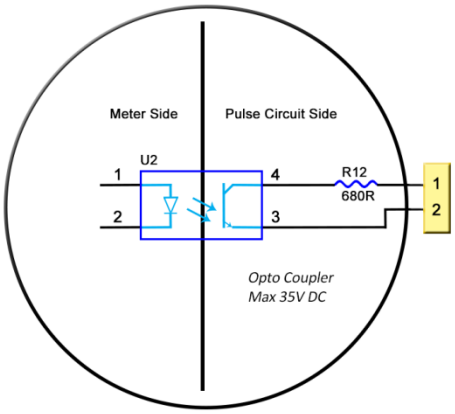
VHU heat meters have a pulse output option.

Type : Opto-Coupler 2-Wire, Max.35V DC,

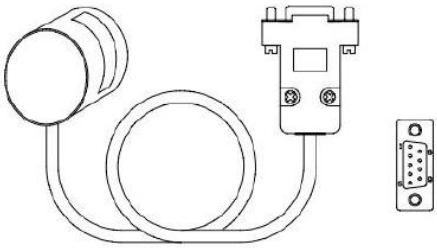
Output signal for testing (type/levels): 0.05 kWH /pulse

Output signal for rate operation: 1 kWh / Pulse

Pulse Output



9. Optical Interfaces



2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	SG	Signal Ground

An optical, infrared transmitter/receiver is situated in the bottom left corner of the front panel, in accordance with the EN 61107 standard. The data format complies with IEC 870 in start mode and can be subsequently changed to a format specified by the manufacturer. A standard optical head with a permanent magnet is used to read data and configure tariff limits.

10. Radio Frequency Interface:

VHU heat meters have a Radio Frequency output option (Wireless M-Bus).

The Radio Frequency communication module operates at 868 MHz wM-BUS (EN 13757-4:2005).

11. Notes on Assembly:

- Install heat meter only after completion of pipework and flushing to avoid damage or contamination
- Do not install temperature sensors within the thermal sphere of influence of other heating circuits
- Temperature sensor cables must not be folded, shortened or extended.
- The Flow sensor must be installed in the supply or return side of the heating circuit as specified at time of order

12. Notes on Glycol & Inhibitor

Contact us or your local distributor for our latest information regarding the use of Inhibitor within the RHI schemes and our operating performance with % Glycol inclusion within system make-up.

13. Warranty

VuHeat warrants the products sold hereunder, properly used and properly installed under normal circumstances and service as described in this user's manual, shall be free from faulty materials or workmanship for 180 days for OEM products, and 365 days for non-OEM products from the date of shipment. This warranty period is inclusive of any statutory warranty. Any repair or replacement serviced product shall bear the same terms in this warranty.

14. Contact

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